DOOSAN Document Transmittal

Upper Trishuli-1 HEP (216MW)

Date	DT No.:	SHEET
2022-06-06	UT1-HEP-DHI-PC-D-0033	1 OF 1

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SUBJECT	Submission of Review Note RN-0132, RN-0133 and RN-0134		

S. N.	REVIEW NOTE NO.	REVIEW STATUS	DWG. / DOC. NO.	REV.	DWG. TITLE / DOC. DESCRIPTION	REMARK
1	RN-0132	AN	UT1-C-090-CVL-DG-64002	0B	Excavation and Initial Support Drawings of Main Access Tunnel to Powerhouse	
2	RN-0133	AN	UT1-C-300-CVL-DC-60001	0B	Stability Calculations for the Surrounding Rock of Powerhouse Cavern	
3	RN-0134	RR	UT1-C-845-CVL-DG-70002	0A	Monitoring Layout Drawing of Underground Powerhouse and Transformer Cavern	
4						
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Received by :

Date :

Legend of Review Status
A : APPROVED
AN : APPROVED AS NOTED
RR : RETURN FOR RESUBMISSION
FI : FOR INFORMATION

DHI STAMP

Doosan Heavy Industries & Construction Co. Ltd. Branch Office Nepal
DOOSAN

Issued by DHI

for

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Project Manager

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Doosan Heavy Industries & Construction Co., Ltd.

Discipline : Civil

UPPER TRISHULI-1 HEP (216MW)

Client	**Nepal Water and Energy Development Company Private Limited**
Owner's Engineer	**Tractebel Engineering GmbH / Jade Consult**

REVIEW NOTE

Contractor	**Doosan Enerbility**		
Title of the Document	Excavation and Initial Support Drawings of Main Access Tunnel to Powerhouse		
Document No.	UT1-C-090-CVL-DG-64002	Revision	0B
Date of Documents	20.05.2022	Received Date	31.05.2022
Transmittal Form No.	UT1-HEP-DHI-D-0247		
Previous Review Date/Status	N/A	Prev. Review Note No.	N/A
Review Note No.	**RN-0132**	**Present Review Date**	**05.06.2022**
		Present Review Status	**AN**

A: Approved AN: Approved as Noted RR: Returned for Resubmission FI: For Information, only

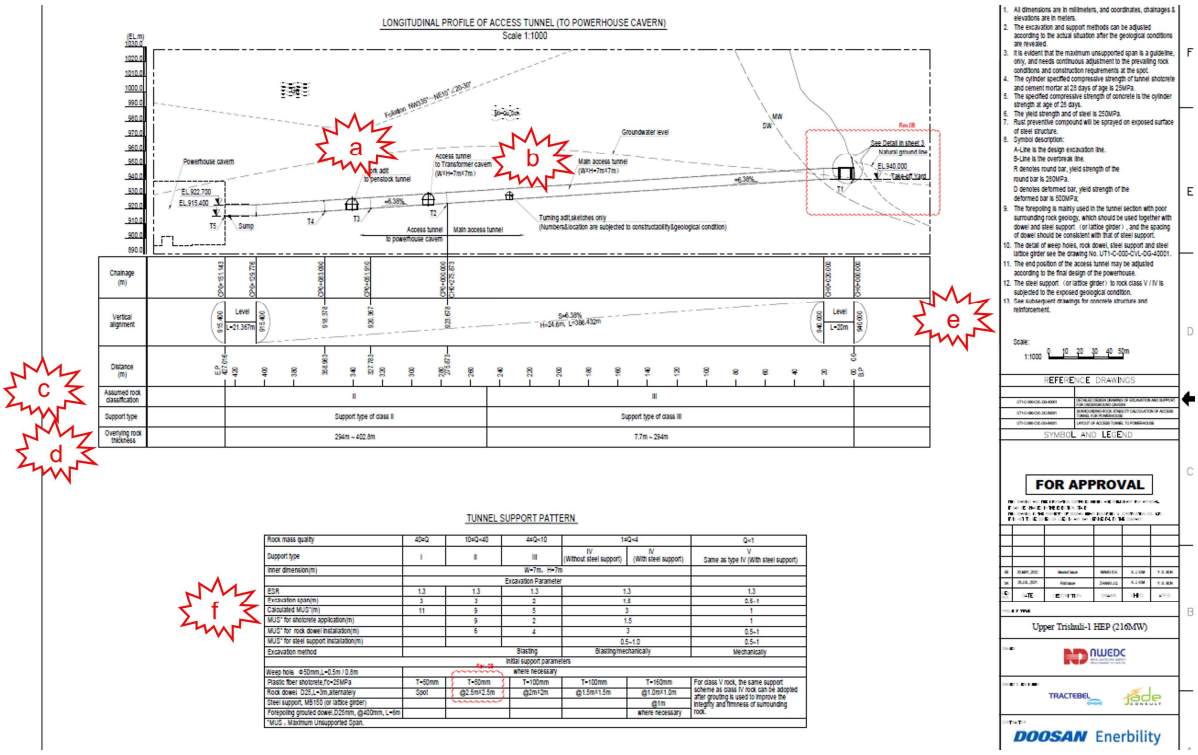
General Comments

The review note in hand does not address the layout of the MAT, the tunnel and branch geometry, the required clearance and any concrete works (liner). It refers to excavation and support requirements, only.

As the tunnel is already constructed to Ch. 0+210 (++) successfully, the drawings of support shall include the actual "as built". This refers to the individual tunnel support classes as well as the portal support. It shall include the required/installed stressed rock bolts in the tunnel roof. It is important to clarify in the drawings, when the rock bolts are installed, when they are incorporated in the system shotcrete support / rock reinforcement, and when they are eventually grouted and covered with a final shotcrete layer.

The main and crucial structures in MAT are the two branches. Detailed construction drawings – in particular series of cross-sections with appropriate, **arched** tunnel roof geometry shall be produced. This is mandatory as the tunnel engineers must know the exact excavation geometry and respective support (installation) for individual rounds when opening these two branches. Note that the maximum effective span in the branches is around 15 m, which is the span of the Transformer Hall.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 1/6), version 0B



(a) Incorporate in the drawing the geological findings from the detailed investigation of discontinuities around the Powerhouse Complex. Provide one overall hemispherical plot and a small table with discontinuity details (Dip and Dip Direction, only).

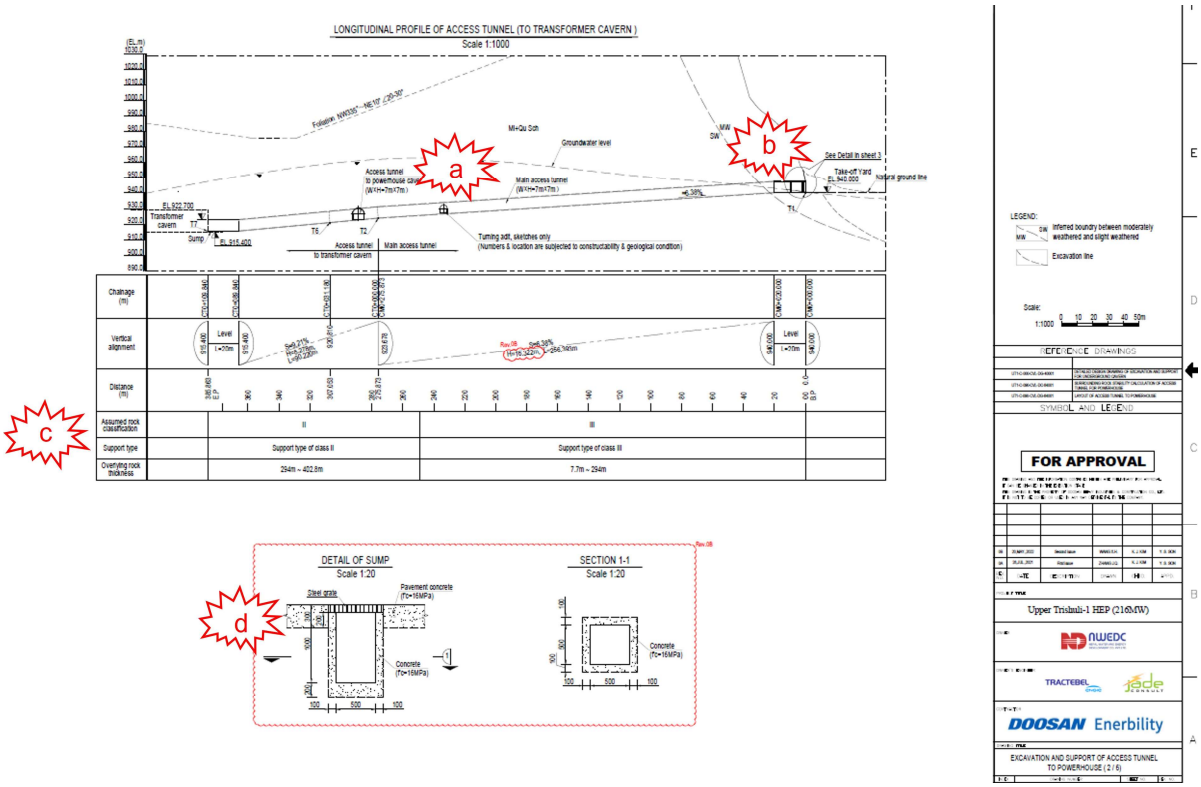
(b) Turning bays not required. Tunnel is large enough for parallel/simultaneous mucking and muck loading.

(c) Delete Support Type row.

(d) Provide overburden thickness for the given chainages above.

(e) Item 13: Make clear reference to respective layout drawing and concrete drawing.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 2/6), version 0B



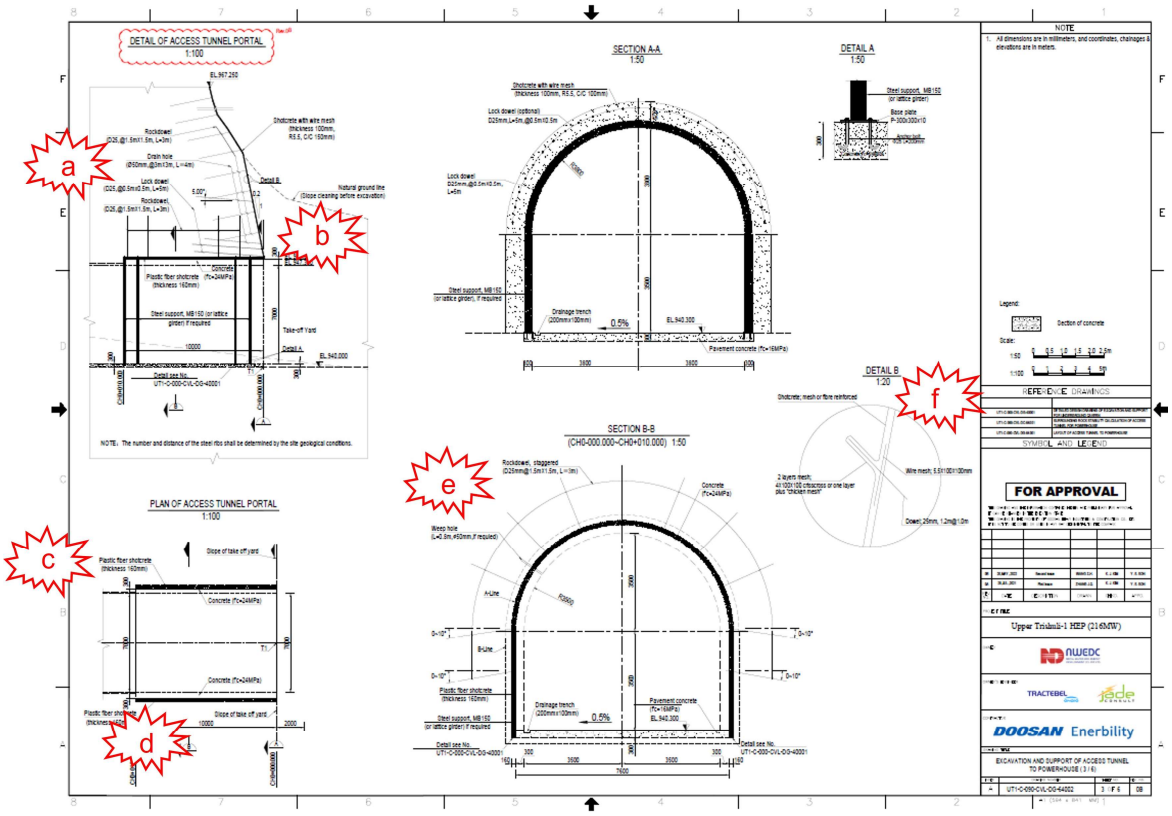
(a) Turning bays not required. Tunnel is large enough for parallel/simultaneous mucking and muck loading.

(b) Adjust slope topography to actual conditions.

(c) Delete Support Type row and provide overburden thickness for the given chainages above.

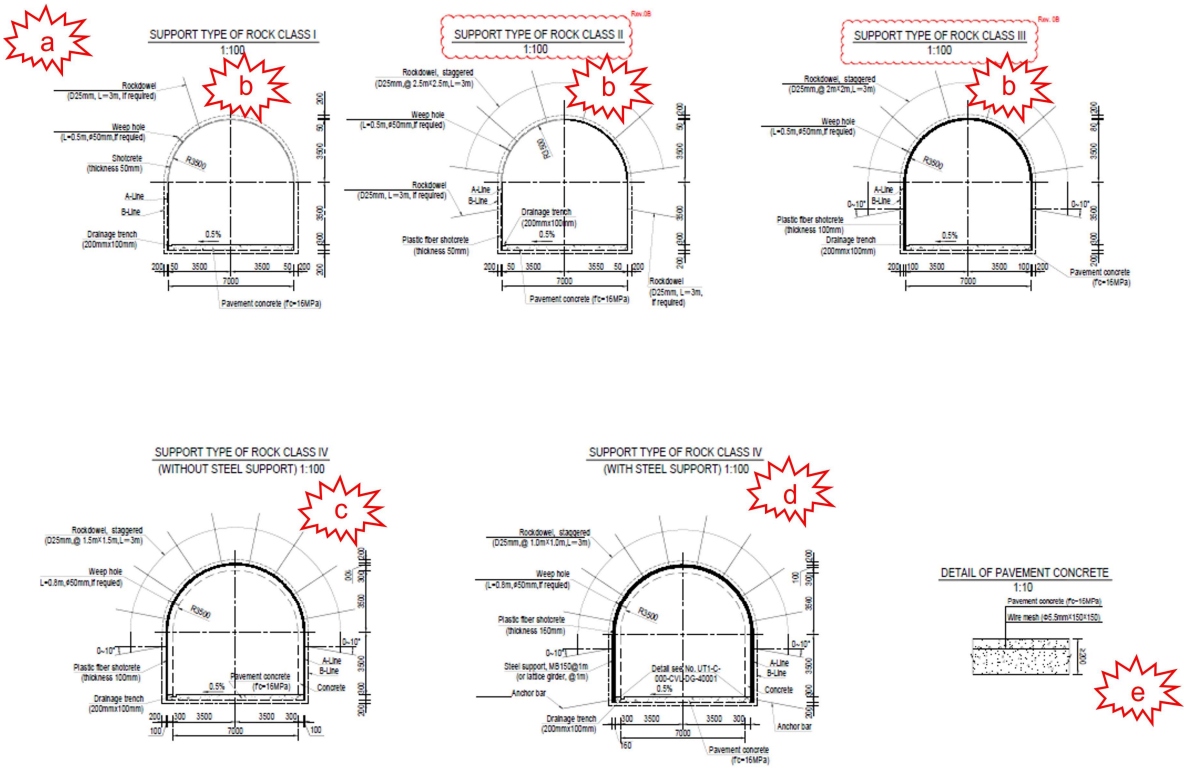
(d) Reconsider sumps sizes and locations. Indicate clearly the location of sumps. Consider actual requirements (= discharge into tunnel in rainy season). Consider also constructability.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 3/6), version 0B



(a) Adjust slope geometry to as actual built conditions and indicate slope support accordingly.
(b) Adjust portal support to actual as built conditions. Indicate permanent concrete portal structure.
(c) Provide actual as built support for roof support.
(d) Provide longitudinal slope of concrete invert.
(e) Adjust roof and sidewall support to actual as built conditions.
(f) Adjust drainage ditch to actual as built conditions.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 4/6), version 0B



(a) Subdivide drawing for Class I, II, III and Class IV, V.

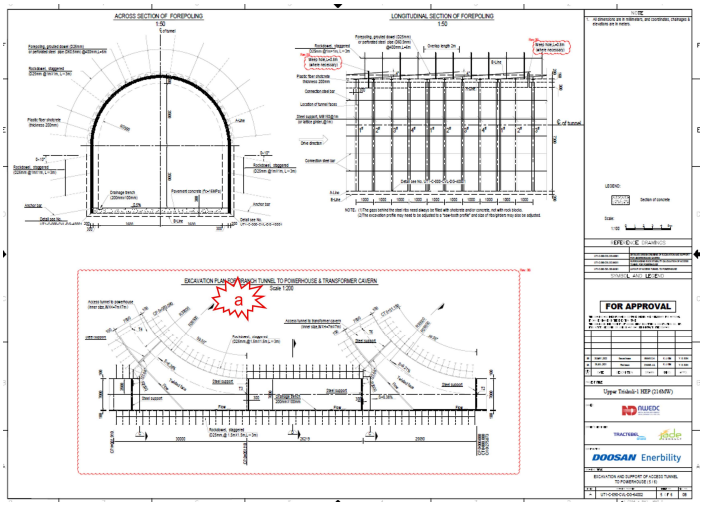
(b) Indicate roof bolts and pattern. Provide drawing of bolts or refer to respective approved drawing. **50 mm of shotcrete in Class II rock are certainly insufficient, particularly when considering that dowels in sidewalls are optional. 80 mm thick shotcrete over the whole perimeter is appropriate.**

(c) Indicate alternatively to concrete liner, shotcrete inner liner with respective strength and thickness.

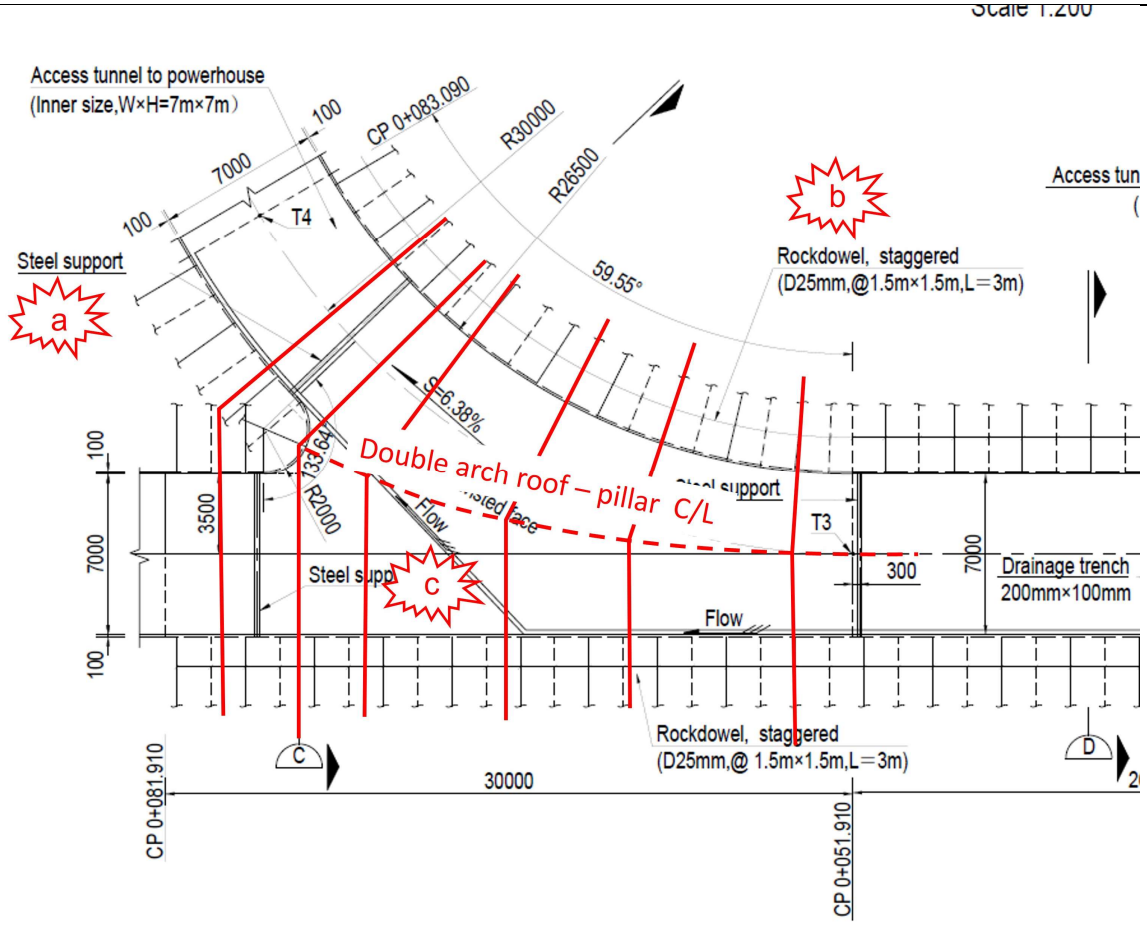
(d) Same as (c).

(e) Reconsider reinforcement in concrete invert ref strength requirements.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 5/6), version 0B



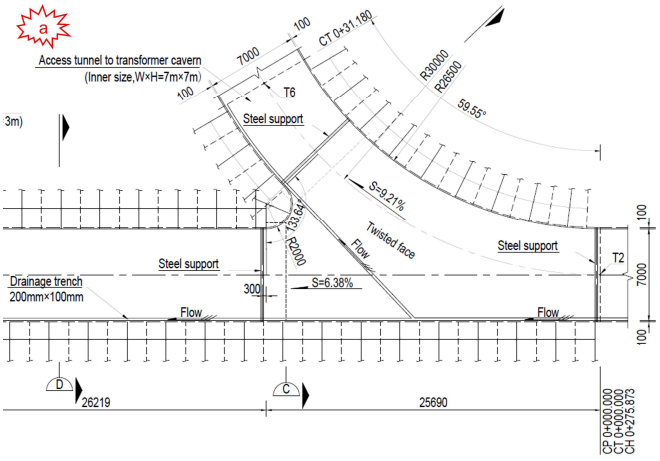
(a) See details below.



(a) Indicate steel support (ribs) as “as required”.

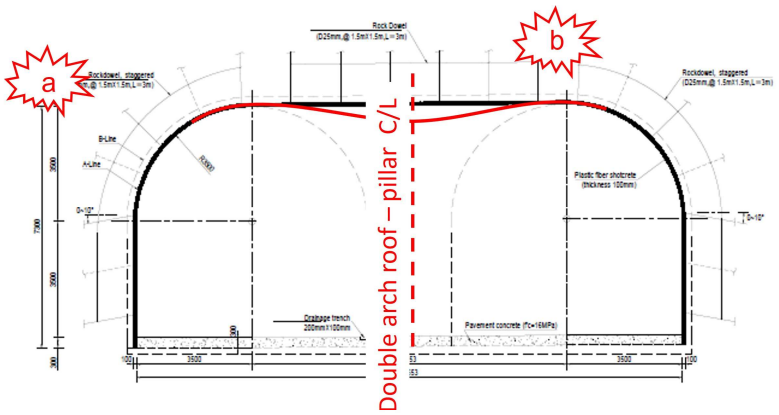
(b) Indicate support for Class III. The branches will presumably be opened in Class II rock. Q-values doubles as Joint Number J_n doubles in junctions. Therefore, use Class III support. Put in notes that it is assumed that the rock class is expected to be Class II, otherwise support needs to be adjusted.

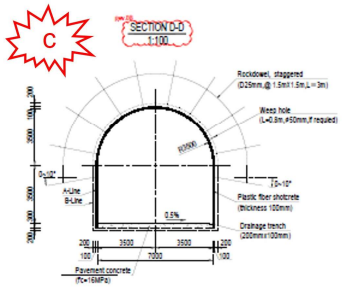
(c) Provide a set of sections, cross sections similar as indicated above with Class III support, and a section along the “double arch roof-pillar centreline”, also with Class III support. Indicate additional support for the pillar in respective sections.



(a) Modify drawing for branch to Transformer Hall as shown above for the branch to Powerhouse.

Drawing No.: UT1-C-090-CVL-DG-64002 (sh. 6/6), version 0B





d

SAFETY INSTRUCTION:

1. THE WORKERS WHO EQUIPPED WITH THE NECESSARY SAFETY PROTECTION MEASURES SHOULD BE FAMILIAR WITH AND COMPLY WITH THE SAFETY RULES FOR CONSTRUCTION, AND MUST ADHERE THE "SAFETY FIRST, PREVENTION FIRST, COMPREHENSIVE MANAGEMENT" APPROACH, TO ENSURE SAFETY ON SITE ;
2. IT 'S FIRST THAT CHECKING THE PROCESSING EQUIPMENT IS NORMAL OPERATION OR NOT, FOR THE PRODUCTION AND THE PERSONAL SAFETY DURING STEEL PROCESSING ,THE OPERATOR SHOULD STRICTLY ABIDE BY THE SCHEDULED OPERATION PROCEDURES ;
3. IT'S REQUIREMENT THAT WELDING MACHINES ARE RELIABLE TO CONNECT GROUND, AND INSULATED CABLES ARE EQUIPPED WITH LEAKAGE PROTECTOR; IT IS STRICTLY PROHIBITED TO THE OPERATION, AND SHOULD WEAR PROTECTIVE GLASSES AND OTHER NECESSARY PROTECTIVE EQUIPMENT DURING STEEL INSTALLING;
4. SECURITY WARNING SIGNS SHOULD BE SET WHEN STEEL LIFTING, THE TEMPORARY LOCATION AND ANTI DUMPING SUPPORT SHOULD BE SAFE AND RELIABLE, SCAFFOLDING, CONSTRUCTION PLATFORM AND CHANNEL SHOULD BE BINDING ;
5. THE WORKERS SHOULD PAY ATTENTION TO THE EXISTENCE UNSAFE AREAS IN THE COURSE OF CONSTRUCTION , AND TAKE PREVENTIVE MEASURES IN TIME.

(a) Adjust to correct section geometry.
(b) Adjust to Class III support.
(c) Delete typical tunnel section, as this already given for the individual support classes.
(d) Delete safety instruction. Provide those in the Method Statement.

DISCLAIMER

Any approval will not release the Contractor from any of his obligations under the Contract.

Dr. U. Glawe